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ABSTRACT

The relationship construct between physicians and patients was explored in the context of medical education and evaluation focusing on the clinical performance of third-year medical students. The Relationship Instrument, a performance-based assessment, was constructed to measure interpersonal and communication skills of the physician interacting with patients. Data came from 370 third-year students in 4 medical schools. Standardized patients were selected and trained for case summaries, scripts, histories, and instruments used in each case to rate the clinical skills of the student physicians at establishing doctor-patient relationships. Preliminary analyses suggested that the Relationship Instrument was reliable and valid. Results with the instrument support a model of doctor-patient relationship that suggests that physician attributes such as gender, age, and race may have an impact on physician communication task and socio-emotional behaviors. There may also be a small but significant effect on patient task and socio-emotional behaviors due to physician attributes. The study also indicates that effective training of standardized patients is a critical component in performance assessments of this sort. Future research should focus on developing more indicators to assess doctor-patient relationship skills. Appendix A is the Relationship Instrument. (Contains 2 figures, 9 tables, and 22 references.) (SLD)

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The Construct Validity of the Relationship Instrument

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Problem

The need to untangle the major variables underlying professional encounters between physicians and patients is essential to the learning, health and well-being of the patients. This is an important and difficult task to undertake since the reasons to like or dislike, comply or non-comply are personal and subjective. The ability to measure behaviors which effect patient behavior is a strong step forward in medical education, particularly clinical assessment, since studies have shown correlations between physician behaviors and patient task behaviors such as compliance and recall,^{1,2} and socio-emotional behaviors such as satisfaction.^{3,4}

Proposed Study

This study explored the relationship construct between physicians and patients within the context of medical education and evaluation focusing on the clinical performance of third year medical students. The Relationship Instrument was deliberately constructed to measure interpersonal and communication skills of the physician interacting with patients within the context of a performance based assessment. Based on research conducted by Hall, et al.⁵ physician behaviors were separated into two domains: task and socio-emotional behaviors. A theoretical model was created to depict the association between these variables in physician and patient behavior (Figure 1).

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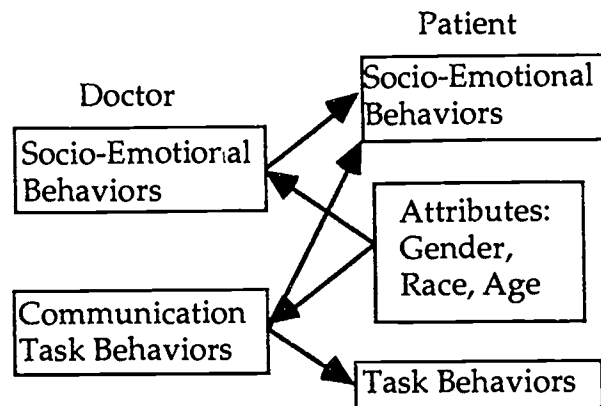


Figure 1: Model of Proposed 2 Factor Doctor-Patient Relationship

The purpose of this study was to provide evidence for the validity of the scores derived from the Relationship Instrument which support the relationship construct under investigation. A construct is an assumed characteristic that is reflected under test conditions.⁶ Messick⁷ argues that construct validity is basically the trustworthiness of the test scores that have been empirically grounded which ties together the "appropriateness, meaningfulness and usefulness" of the test instrument's scores. In other words, construct validity integrates content and criteria based validity with the consequences of the test scores by testing hypotheses about theoretically relevant relationships. Therefore, in investigating the evidence for the validity of the scores on the Relationship Instrument, construct validity was the focus for the evidence gathered to argue the validity of the scores derived from the instrument. Thereby, the construct validity study of the doctor-patient relationship answers the critical question: "Should the test scores [on the Relationship Instrument] be interpreted and used in the manner proposed?"⁷ (p.4).

Research Questions

The following research questions about the scores derived from the Relationship Instrument were related to evidence necessary to establish the construct validity of the instrument.

1. Do gender, race and age effect test performance?
2. Is the Relationship Construct a valid one?

Design

The data were collected during the summer and early fall of 1993. The CPX is a two-day twenty-station SP-based standardized examination of clinical skills. The exam assesses the clinical skills of the students using medical simulations. Research studies have reported performance based examinations of clinical skills with standardized patients as a reliable and valid method of assessing the clinical skills of medical students.⁸⁻¹⁰

Standardized patients (SPs) were selected according to criteria specified by case authors and were trained according to case summaries, scripts, histories, and instruments used in each case. SPs ranged in age from 9 - 70 years old, and included African Americans and Caucasians. Training lasted 6 - 10 hours depending on the age of the patient and the complexity of the case and instruments.

The Relationship Instrument (Appendix A) was developed by a panel of educational and medical experts who wrote the items for the instrument based on clinical experiences and a review of the literature. Research conducted by Bolton, et al.¹¹ have focused on the factorial design of the instrument and found it to be consistent with the interpretation of the two components of the doctor-patient relationship used to construct the instrument. The two factors were described as Socio-Emotional and Communication Task Behaviors. Socio-Emotional Behaviors reflect those skills which take into account the patient's social and emotional well being, as well as the resulting feelings of the patient due to the physician's skill. For example, Item 1 which loaded highly on factor 1 states, "The student physician appeared empathetic (seemed sensitive, understood my problems, etc.)." Communication Task Behaviors Scale target the behaviors that facilitate the transmission of knowledge by engaging the patient in the relationship process. Item 13 which loaded highly on this factor states, "The student physician checked my understanding of what s/he said."

Further analysis on the Relationship Instrument revealed a high level of reliability for both scales (Socio-Emotional, .98; Communication Task Behaviors, .94) and supported continued use of the Relationship Instrument to measure Socio-Emotional Behaviors and Communication Skills of student physicians in a clinical performance examination.¹¹

Characteristics of the Sample

The data for this study was based on 370 third year medical students from four medical schools provided by the North Carolina Medical School Consortium. The total number of students at the four sites was 440, but 70 were absent or excused

because of unavailability (i.e. out of the state or country), illness, or incompleteness of third year clerkships (i.e. part-time students). (See Table 1).

Table 1: Sample Frequency Distribution by Gender, Race, and Age

		<u>Frequency</u>	<u>Percent</u>
Gender	Male	221	59.7
	Female	149	40.3
	Total	370	100
Race	Caucasian	298	80.5
	African American	32	8.6
	Asian	34	9.2
	Other	6	1.7
	Total	370	100
Age	24-26 years old	137	50.4
	27 and older	135	36.5
	Missing	98	13.1
	Total	370	100

Effects of Gender, Race and Age on Test Performance

Analysis of variance was used to examine the effects of three variables - gender, race and age - on the Relationship Instrument scores. The independent variable race was initially broken down into five categories (Caucasian, African American, Asian, Native American, and Hispanic/Other), but because of the small numbers in the last two categories ($n=6$) these were omitted in the analysis making the comparison among Caucasians, African Americans, and Asians. For this study, a normal age range was designated for the typical third year medical student as 24-26 years old. 'Older students' were defined as 27 years and older. The gender variables were male and female. The grand mean for Socio-Emotional Behaviors was 14.73 with a standard deviation of 2.23 (score range 8 - 32). The grand mean for Communication Task Behaviors was 9.57 with a standard deviation of 1.24 (score range 5 - 20). Assumptions regarding the normal distribution of the dependent variables with equal variance were met.

Analysis of variance showed there was no significant interaction ($\alpha = .05$) between the three independent variables or any 2-way combinations for either of the two dependent variables. This allowed the examination of the Main Effects. Next, separate analyses of variance were performed with each independent variable. The first analysis identified a significant gender difference in scores on both scales with females being rated as having higher Socio-Emotional Behaviors (Table 2) and Communication Task Behaviors than males (Table 3). Effect sizes (R^2) indicated however that gender accounted for only 4% of the variance on the Socio-Emotional

Behaviors Scale and only 3% of the variance on the Communication Task Behaviors Scale.

Table 2 Means and Standard Deviations and ANOVA Results on the Socio-Emotional Behaviors Scale by Gender

		<u>Means and Standard Deviations</u>		
<u>Gender</u>		<u>N</u>	<u>Mean</u>	<u>SD</u>
Male		221	15.08	2.35
Female		149	14.21	1.92
		<u>Results of ANOVA</u>		
<u>Source</u>	<u>DF</u>	<u>Sum of Square</u>	<u>F</u>	<u>P</u>
Model	1	67.875	14.189	.000
Error	368	1760.320		
Corrected Total	369	1828.195		
R ²	.037			

Table 3: Means and Standard Deviations and ANOVA Results on the Communication Task Behaviors Scale by Gender

		<u>Means and Standard Deviations</u>		
<u>Gender</u>		<u>N</u>	<u>Mean</u>	<u>SD</u>
Male		221	9.74	1.25
Female		149	9.32	1.18
		<u>Results of ANOVA</u>		
<u>Source</u>	<u>DF</u>	<u>Sum of Square</u>	<u>F</u>	<u>P</u>
Model	1	15.809	10.557	.001
Error	368	551.084		
Corrected Total	369	566.894		
R ²	.028			

The second analysis on the effects of age also indicated that there was a significant difference. Student physicians 27 years and older were rated to have higher socio-emotional and communication skills than their 'normal' aged peers 24-26 years of age (see Tables 4 and 5). However, the amount of variance accounted for on the two scales due to age was approximately 2% for Socio-Emotional Behaviors and 3% for Communication Task Behaviors.

Table 4 Means and Standard Deviations and ANOVA Results on the Socio-Emotional Behaviors Scale by Age

<u>Means and Standard Deviations</u>				
Age	N	Mean	SD	
24-26	137	14.77	2.20	
27 and older	135	14.23	2.32	
<u>Results of ANOVA</u>				
Source	DF	Sum of Square	F	P
Model	1	20.375	3.992	.047
Error	270	1378.024		
Corrected Total	271	1398.399		
R ²	.015			

Table 5: Means and Standard Deviations and ANOVA Results on the Communication Task Behaviors Scale by Age

<u>Means and Standard Deviations</u>				
Age	N	Mean	SD	
24-26	137	9.66	1.28	
27 and older	135	9.20	1.20	
<u>Results of ANOVA</u>				
Source	DF	Sum of Square	F	P
Model	1	14.639	9.504	.002
Error	270	415.884		
Corrected Total	369	430.523		
R ²	.034			

Results on the third analysis indicated that race was also statistically significant in relation to the variance on both scales (Tables 6 and 7). The mean scores for Caucasians (14.62), African Americans (14.28), and Asians (16.03) on the Socio-Emotional Behaviors Scale were found significantly different at $p < .001$ but accounted for only 4% of the variance. The same result occurred on the Communication Task Behavior Scale where the mean scores 9.50, 9.39, and 10.36 respectively were significant at $p < .000$ but accounted for about only 4% of the variance. However, since there were more than two groups, further analysis was needed to determine which groups were different. Tukey's HSD was used to test for differences between Caucasian, African American and Asian students. These statistics revealed that there were no statistical differences between Caucasian and African American students on either scale. African American students were rated as significantly better on the Socio-Emotional and Communication scales than Asian students on both scales. Caucasian students were also rated as significantly better than Asian students on both scales (Table 8 and 9).

Table 6: Means and Standard Deviations and ANOVA Results on the Socio-Emotional Behaviors Scale by Race

Means and Standard Deviations				
Race	N	Mean	SD	
Caucasian	298	14.62	2.09	
African American	32	14.28	1.84	
Asian	34	16.03	2.55	
Results of ANOVA				
Source	DF	Sum of Square	F	P
Model	2	67.064	7.514	.001
Error	361	1611.038		
Corrected Total	363	1678.102		
R ²	.04			

Table 7: Means and Standard Deviations and ANOVA Results on the Communication Task Behaviors Scale by Race

Means and Standard Deviations				
Race	N	Mean	SD	
Caucasian	298	9.50	1.18	
African American	32	9.39	1.16	
Asian	34	10.36	1.33	
Results of ANOVA				
Source	DF	Sum of Square	F	P
Model	2	23.722	8.317	.000
Error	361	514.850		
Corrected Total	363	538.571		
R ²	.044			

Table 8: Post-hoc Comparisons of Socio-Emotional Behaviors Scale by Race

	Asians X = 16.03	Caucasians X = 14.62	African Americans X = 14.28
Asians X = 16.03		1.41*	1.75*
Caucasians X = 14.62			.34
African Americans X = 14.28			

*p < .05

$$HSD = q_{\alpha, r, df} \sqrt{\frac{MeanSquare_{wg}}{N}}$$

$$HSD = 3.31 \sqrt{\frac{4.463}{364}}$$

$$HSD = \pm .366$$

Table 9: Post-hoc Comparisons of Communication Task Behaviors by Race

	Asians X = 10.36	Caucasians X = 9.50	African Americans X = 9.39
Asians X = 10.36		.86*	.97*
Caucasians X = 9.50			.11
African Americans X = 9.39			

*p < .05

$$HSD = q_{\alpha, r, df} \sqrt{\frac{MeanSquare_{wg}}{N}}$$

$$HSD = 3.31 \sqrt{\frac{1.426}{364}}$$

$$HSD = \pm .2072$$

Is the Relationship Construct a Valid One?

In order to validate an abstract concept like the doctor-patient relationship, the measurement process must be able to detect the factors implied by the construct and their subsequent relationship with other variables. The evidence offered here is that the measurements derived from the Relationship Instrument are consistent with the interpretation of the construct. The exploratory factor analysis indicated that theorized dimensions of the relationship construct, namely the Socio-Emotional and Communication Task Behaviors, were reliably measured by the Relationship Instrument.¹¹ Although analysis of variance did pick up differences in groups, this finding does not detract from the validity of the instrument. Messick⁷ states that "authentic group differences in knowledge and skill, . . . are not in themselves indicative of test invalidity." (p. 11).

Gender Differences

The difference between mean scores based on gender was less than one half point and only accounted for about 3% of the total variance. This finding is supported by other studies that have found differences due to gender in interpersonal relationships. Females have been found to be superior to males in interviewing patients,¹² communicating care and empathy better to their patients¹³ and are reported to have significantly higher patient satisfaction scores.¹⁴ According to Arnold,¹³ female physicians' communication styles may cause this difference. Females tend to have less obtrusive speech patterns than males who tend to dominate conversations.¹⁵ This in turn may allow patients to present their

complaint or agenda and allow more time for discussion, thus producing a stronger sense of rapport between female physicians and their patients.¹³ Other studies have found that when more concern and care is taken in the interviewing process, more information is gathered from the patient,¹⁶ and a higher compliance rate results.^{3, 17-19} In addition, cultural expectations about sex role identification may cause raters to sense more sensitivity and empathy in female physicians than male. This might produce a gender bias in the standardized patients (i.e. raters). Ratula, et al.²⁰ uncovered this effect and found that patient gender interacted with student gender in predicting scores on an objective structure clinical examination (OSCE). However, a study by Colliver, et al.²¹ found no such effect when given an equal mix of male and female S₁ cases. In the present study actual differences were small as indicated by the effect sizes; thus, one can conclude that though differences may exist due to gender in the performance on these two dimensions of the doctor-patient relationship, the Relationship Instrument does not unfairly discriminate against males.

Age Differences

For this study, a normal age range was designated for the typical third year medical student as 24-26 years old. 'Older students' were defined as 27 years and older. It was assumed that these students may be atypical in their experiences (i.e. taking extra time to complete undergraduate degrees, pursuing other careers, or taking time to have children or travel) which may affect their socio-emotional and/or communication abilities. As the results indicate, older students were rated higher than their normal aged peers on the Socio-Emotional and Communication Task Behaviors Scales of the Relationship Instrument. This difference may be accounted for by considering that this instrument is measuring competencies other than traditional cognitive abilities, and that life experiences can play an important role in developing such skills, thereby affecting the scores on the instrument. Those students who are more than two years older than the traditional student have had life experiences other than a focused path of education and research. Also, it is possible that older students may appear to the patient (raters in this study) as "wiser" than the younger students, which may cause the raters to have an unintentional bias in favor of older students. However, since the sizes of these effects were so small, it is concluded that the instrument does not unfairly discriminate against normal aged medical students.

Race Differences

There were no differences between African American and Caucasian students. African American and Caucasian students were rated to have better Socio-Emotional and Communication Task Behaviors than Asian students. This finding may in part be due to language skills. Although data was not gathered as to the number of students who spoke English as a second language, some of the Asian students were not Asian Americans, but natives of Asian countries. This may reduce their effectiveness to communicate, thereby hindering their ability to build effective doctor-patient relationships in the time limit (15 - 25 minutes) for each case. In addition, cultural differences regarding the role of the health care professionals, professional responsibilities and expectations, and communication styles may cause a bias by western patients (i.e. SP raters) who do not understand or interpret the behavior of Asian students in an unbiased manner. This interaction may further be affected by the absence of Asian SPs. Although less than 9% of the medical students were African American, over 30% of the SPs were African American, representative of the racial population in North Carolina. A similar balance should be the goal for other racial populations. With the large number of Asian students taking the CPX (9%), not having any Asian SPs may present an unfair test bias towards Asian students. Further research is needed to determine if this instrument is subject to bias due to race. Also, more data needs to be collected as to the language abilities of the medical students taking this exam.

Statistically, the findings of these analyses do not support the third research hypothesis that there are no differences on the Relationship Instrument scores due to gender, age, or race. However, the magnitude of the observed mean differences are so small on both scales that they are not likely to play an important role in the observed behavior of student physicians.

Conclusions and Recommendations

The ability to measure behaviors which effect patient behavior is a strong step forward in medical education, particularly clinical assessment. The revised doctor-patient relationship model indicates that physician attributes such as gender, age and race may have an impact on physician communication task and socio-emotional behaviors. According to the results of this study, there may also be a small but significant effect on patient task and socio-emotional behaviors due to physician attributes. Therefore, a revised model of the physician-patient relationship has been developed (Figure 2).

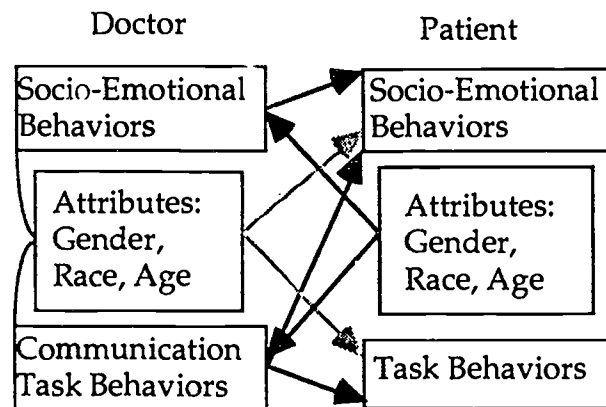


Figure 2: Revised Doctor-Patient Relationship Model

The need to further explore the reciprocity of the doctor-patient relationship is critical in order to understand what effects patient behaviors have on the physicians interacting with them. Furthermore, the knowledge that physician attributes such as gender, age, and race can and do have an impact on doctor-patient interactions, offers a unique educational opportunity to facilitate student physician development in these areas.

This study explored how student physicians interacted with standardized patients (SPs) who were trained to rate their clinical skills at establishing doctor-patient relationships. It was beyond the scope of this study to determine how consistently the SP interacted with student physicians, or the standardization of SPs within and across cases. However, as in all relationships, there is an inherent bidirectionality of communication and other interpersonal factors that must be taken into consideration. The ability to hold constant the SP variable is essential to the development of performance assessment measures using humans. Effective SP training is a critical component to the success of performance assessment measures.

Investigating the construct validity of measures of professional relationships is a difficult, frustrating and complex task but such measures are essential to verify that physicians in training are skilled in those areas which are essential to the health and well being of the patients with whom they work. This study has offered evidence in support of the doctor-patient relationship construct by investigating the nature, meaning, and value of the scores derived from the Relationship Instrument.

Further recommendations include conducting a multitrait multimethod matrix as proposed by Campbell and Fiske²² which would provide valuable

evidence regarding the convergent and discriminant validity of the Relationship Instrument. This method would analyze the inter-relationships between the various dimensions of the construct using different methods of measurement. Discriminant validity could compare the relationship between different traits measured by the same method (e.g. different domains on the CPX) or different traits measured by different methods (e.g. United States Medical Licensing Exam scores). Convergent validity measures similar traits using different methods. One problem with this method is there are very few, if any, opportunities that now exist to measure the doctor-patient relationship construct. However, some recommendations for obtaining these data include student self-reports, or clinical faculty evaluations. Future research should focus on developing more indicators to assess doctor-patient relationship skills.

In addition, research should continue to investigate the theoretical model proposed by Hall, et al.⁵ The Relationship Instrument could be further analyzed in order to investigate the degree of reciprocity between physician and patient variables (i.e. analyzing prompts on the basis of "The Student Physician . . ." and "As a Patient, I felt . . ."). Finally, path analysis could compute the strengths of the socio-emotional and communication task behaviors of the relationships proposed.

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Appendix A

Relationship Instrument

Physician Name _____

Remember to:

Fill in ALL the blanks above, including the code bubbles.
Complete all items on the checklist--don't skip any!
For each item, darken one bubble per item using the given scale
Write comments below as desired.

Strongly Disagree
Disagree
Agree
Strongly Agree

THE STUDENT PHYSICIAN APPEARED...

empathetic (seemed sensitive, understood my problems, etc.)

respectful (used my name, used language I could understand without speaking down to me,
etc.)

interested (listened to my story, followed up on my comments and questions, etc.)

AS A PATIENT, I FELT...

that the student physician understood me

that I would respect the advice the student physician gave me

comfortable asking for additional information or clarification

safe in expressing myself and describing my situation

that this encounter could be the beginning of a good doctor-patient
relationship

THE STUDENT PHYSICIAN...

helped me explain my situation and clarify my concerns

summarized what I said

gave me opportunities to ask questions and make comments

provided clear information

checked my understanding of what s/he said

helped me take an active role in my care

asked about my needs and interests

WRITTEN COMMENTS: